



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/533,182

04/27/2005

Seiji Sugiura

TOW-108US

4456

959 7590 01/06/2009

LAHIVE & COCKFIELD, LLP  
FLOOR 30, SUITE 3000  
ONE POST OFFICE SQUARE  
BOSTON, MA 02109

EXAMINER

HAN, KWANG S

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

01/06/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/533,182	<b>Applicant(s)</b> SUGIURA ET AL.	
	<b>Examiner</b> Kwang Han	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/25/08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

**FUEL CELL**

Examiner: K. Han    SN: 10/533,182    Art Unit: 1795    December 30, 2008

**DETAILED ACTION**

1.     The Applicant's amendment filed on September 28, 2008 was received. Claims 1, 9, and 14 were amended.
  
2.     The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Priority***

3.     Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file. Applicant's request for a Request to Retrieve Electronic Priority Application is acknowledged.

***Specification***

4.     The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

***Claim Rejections - 35 USC § 103***

Art Unit: 1795

5. The claim rejection under 35 U.S.C. 103(a) as unpatentable over Inoue et al. in view of Enjoji et al. on claims 1-15 are withdrawn, because claims 1, 9, and 14 have been amended.

6. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (US 2001/0044042, previously cited) in view of Enjoji et al. (US 2003/0129475, previously cited) and Sha et al. (JP 2000-164230, machine translation).

Regarding claim 1, Inoue is directed to a fuel cell comprised of the following:

- a electrolyte electrode assembly (12) and separators (14, 16) stacked alternately (Figure 1) [33],
- the electrolyte electrode assembly includes an anode (22), a cathode (20), and an electrolyte (18) interposed between the electrodes [34],
- a fuel gas supply passage (36a) [38],
- a oxygen-containing gas supply passage (38a) [40],
- a coolant supply passage (40a) [45],
- a fuel gas discharge passage (36b) [38] ,
- an oxygen-containing gas discharge passage (38b) [38],
- a coolant discharge passage (40b) [37],
- the passages extending through the fuel cell in the stacking direction (Figure 1),
- the separator including a first and second plate (14, 16) stacked together (Figure 6) [33],

- the first metal plate (14) has an oxygen-containing gas flow field including a curved flow passage (Figure 3),
- second metal plate (16) has a fuel gas flow field including curved flow passage (Figure 4), and
- a coolant flow field with straight flow grooves (Figure 5).

Inoue is silent towards the use of inlet and outlet buffers for any of the fluid passage.

Enjoji et al. teaches the use of buffers at the inlet and outlet regions of the coolant passage grooves in a fuel cell for the benefit of supplying fluids into the surfaces of the separators along the passage grooves uniformly [0008] but is silent towards having buffers which are separate from each other. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Enjoji's buffers to each inlet and outlet passage as required in Inoue's coolant supply passages for the benefit allowing for uniform distribution of coolant fluids in the fuel cell.

Sha teaches a separator for a fuel cell including fluid passages with multiple conduction slots (buffers; 11, 10, 13d, 12) at the inlet and outlet regions of the flow grooves and fluid passages for the benefit of minimizing stagnation of fluids and allow for more uniform distribution of fluids [0048, 0049] (Drawing 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to use multiple buffers separate from each other in the fuel cell of Inoue and Enjoji because Sha teaches it provides for minimizing stagnation of and a more uniform distribution of fluids.

Regarding claim 2, the teachings of Inoue, Enjoji and Sha as discussed above are herein incorporated. The buffers of Enjoji are taught to be applied around the

Art Unit: 1795

passage inlets and outlets in order to supply fluids and can be applied to both separator plates (14, 16) of Inoue. The positions of the second buffers on the second plate would have to be different from the first set of buffers on the first plate because when the plates are brought together the buffers would interfere with each other if they were in the same positions.

Regarding claim 3, the teachings of Inoue, Enjoji, and Sha as discussed above are herein incorporated. Inoue is silent towards the use of buffers for the gas supply passages.

Enjoji et al. teaches the use of buffers at the inlet and outlet regions of fluids including fuel gas and oxygen-containing gas for the benefit of supplying fluids into the surfaces of the separators along the passage grooves uniformly [0008]. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Enjoji's buffers in Inoue's fuel gas supply passage for the benefit of minimizing stagnation of the fuel gas and uniform distribution.

Regarding claim 4, Inoue teaches a fuel gas flow field (Figure 4) and an oxygen-containing gas flow field that includes a serpentine flow passage (Figure 3).

Regarding claim 5, the teachings of Inoue, Enjoji, and Sha as discussed above are herein incorporated. Inoue teaches the use of serpentine flow passages which decrease as the passage approaches the outlet (Figures 3 and 4) but is silent towards the number of grooves or passages decreasing then increasing.

Enjoji teaches the use of passages which are formed by protrusions and guide ribs [22] which can vary depending upon the path the coolant takes (Figure 4) to

Art Unit: 1795

sufficiently cool the fuel cell. Enjoji further teaches number of passages which decreases at the coolant initially enters the coolant flow field for allowing entry of coolant (Figure 4, near the coolant entry, 20a) then the number of passages increase to allow the coolant to travel through the more interior passages for providing coolant to a larger region.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Enjoji's decreasing then increasing of the number of coolant passages in Inoue's fuel cell to allow for entry of and then the distribution of coolant over the coolant flow field. Furthermore, it would also have been obvious to one of ordinary skill in the art at the time of the invention to decrease or increase the number of grooves in the flow passage since it has been held that discovering the optimum ranges for a result effective variable such as the number of grooves involves only routine skill in the art in the absence of showing of criticality in the claimed range (MPEP 2144.05). The configuration of the flow passage using grooves would depend in the cooling requirements for the fuel cell.

Regarding claim 6, Inoue teaches a fuel gas flow field and oxygen-containing gas flow field that includes a substantially U shaped flow passage (Figures 3 and 4).

Regarding claim 7, Inoue teaches a fuel cell where the first and second metal plate (14, 16) (Figure 6) has a horizontally long rectangular shape (Figures 3, 4, and 5) and stacked in a horizontal direction [33] (Figure 1).

Regarding claim 8, Inoue teaches that among the six passages for the gas flow passages three passages extend through a left end of the first and second plates and

Art Unit: 1795

the other three passages extend through a right end of the first and second plates (Figures 3, 4, 5).

Regarding claim 9, the teachings of Inoue, Enjoji, and Sha as discussed above for claim 1 above is herein incorporated. Inoue teaches the number of grooves in a first inlet (76, far left or right) and outlet (78, far left or right) connection passage which is different from the number of grooves in a second inlet (76, middle) and outlet (78, middle) connection passages.

Regarding claim 10, the teachings of Inoue, Enjoji, and Sha as discussed above are herein incorporated. Inoue further teaches a fuel cell comprised of the following:

- a oxygen-containing gas flow field (42) including a curved flow passage formed on the surface of a first metal plate (14) (Figure 3), and
- a fuel gas flow field (60) including a curved flow passage on the surface of a second metal plate (16) (Figure 4).

Regarding claim 11, the applicant is directed to the discussion above for claim 4.

Regarding claim 12, the applicant is directed to the discussion above for claim 7.

Regarding claim 13, the applicant is directed to the discussion above for claim 8.

Regarding claim 14, the teachings of Inoue, Enjoji, and Sha as discussed above are herein incorporated. Inoue further discloses a fuel cell that has the same number of turn regions between the oxygen-containing gas flow field and the fuel gas flow field (Figures 3 and 4).

Regarding claim 15, the applicant is directed to the discussion above for claim 8.



***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact/Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./

Examiner, Art Unit 1795

/Dah-Wei D. Yuan/

Supervisory Patent Examiner, Art Unit 1795